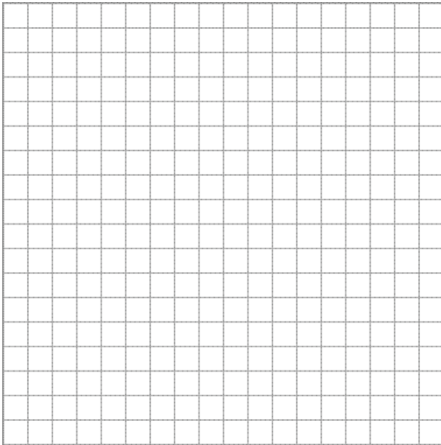


Section 3-6: Fitting a Line to Data

Warm-up: In-class Activity (p. 168)



3.

4.

Scatterplot:

Line of Best Fit/Regression Line:

Coefficient of Correlation:

How do you use a graphing calculator to determine a line of best fit?

Example 1: The following information shows the amount of time spent exercising each week and the resting heart rates in beats per minute of members of an aerobics class.

4 h, 60 bpm	3 h, 63 bpm	3.5 h, 67 bpm	4 h, 55 bpm
2 h, 70 bpm	2.5 h, 65 bpm	3 h, 60 bpm	5 h, 50 bpm
4.5 h, 60 bpm	5 h, 65 bpm	4.5 h, 50 bpm	3 h, 70 bpm
5 h, 55 bpm	1 h, 75 bpm	3 h, 55 bpm	4 h, 57 bpm

a. Rewrite the data as a set of ordered pairs.

b. Follow these steps to graph the data. We will enter the values for time in **L1**, and bpm in **L2**. Make sure that you enter the values in the same order for both lists (that is, make sure that the points “stay together.”)

Now press 2^{nd} then **STAT PLOT** to graph this information. Go to **1:Plot1...** and press **ENTER**. Turn this plot **On** and select the scatter plot under **Type:**. Your **Xlist:** should be **L1** and **Ylist:** should be **L2** (or whatever lists you may have used). You can also choose which mark will appear on your graph. Next, press **ZOOM** and find **9:ZoomStat**. You now have your scatter plot shown, without having to worry about setting up a window. **NOTE:** You may not get the graph you want if you have an equation listed under **Y=**, so make sure all of those graphs are turned off.

We can check the correlation by making a line of best fit. First, we need to turn on the diagnostic. Press 2^{nd} then **CATALOG** and find **DiagnosticOn** and press **ENTER**. (You only need to do this once.) Now press **STAT** and go to the **CALC** menu. Find **4:LinReg(ax+b)** and press **ENTER**. We need it to find the line of best fit for the lists **L1** and **L2**, so we need to enter those on our screen as well, placing commas after each list. We also need to have the equation, so we press **VARS** and go to the **Y-VARS** menu and find **1:Function...**. We want **1:Y1**. Now your screen should have this on it: **LinReg(ax+b) L1, L2, Y1**. Press **ENTER**. You will see on the main screen what y , a , b , r^2 , and r all equal. The correlation will be given by r .

When you press **Y=**, you will see an equation for the line of best fit. Also, if you press **GRAPH**, you will see the line on our scatter plot. We can now use this line to predict what will happen at other points on the graph.

Press **TRACE** to predict what the heart rate is for someone who exercises for 2 hours would be. Make sure you are tracing the line and not the plotted points.

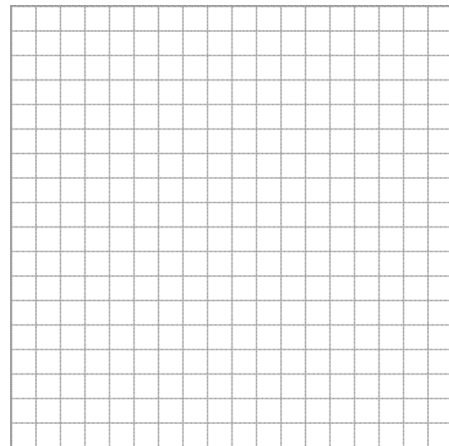
Example 2: The following table represents the average time studying per week in hours with the final grade earned in a math class. Create a scatter plot and put in a line of best fit, then answer the questions.

(6, 80), (1, 65), (5, 85), (2, 60), (5, 70), (3, 70),
(9, 95), (8, 90), (3, 80), (7, 70), (4, 65), (8, 75),
(4, 80), (7, 85), (9, 85), (10, 95), (1, 75)

a. What correlation exists?

b. What is the correlation value (r)?

c. If you spent 5 hours a week studying, what grade would you expect?



Homework:

"Your true value depends entirely on what you are compared with." - Bob Wells